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HALLIBURTON NUS
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Received 2/5/92 by
V. Janosik, RPM

January 30, 1992

Project Number 1129

Mr. Victor Janosik
Remedial Project Manager
U.S. Environmental Protection Agency
841 Chestnut Street
Philadelphia, PA 19107

Reference: ARCS III Program
EPA Contract No. 68-W8-0037

Subject: Douglassville Disposal Site
EPA Work Assignment No. 37-11-3R51
Onsite Neutralization Summary Report

Dear Mr. Janosik:

Enclosed is a copy of the Onsite Neutralization Summary Report for acid sludge neutralization performed during November 1991 as part of Change Order No. 9.

Please call me at 412-921-8509 or Rich Cromer at 412-215-6322 if you have any questions.

Very truly yours,

John A. Dziubek
Project Manager

JAD/pm
Enclosure
cc: Mr. Jeffery Barnett (EPA)
Mr. Sidney Ozer (EPA) (w/o enclosure)
Mr. Leonard Johnson (HALLIBURTON NUS)
Ms. Margaret Price (HALLIBURTON NUS) (w/o enclosure)
Mr. Randall Elder (HALLIBURTON NUS)
Mr. Richard Cromer (HALLIBURTON NUS)
Mr. Garth Glenn (HALLIBURTON NUS) (w/o enclosure)

NUS CORPORATION

INTERNAL CORRESPONDENCE

January 17, 1992

FROM: Mike Snyder MS

COPIES: Rich Cromer

TO: Jack Dzuibek

REFERENCE: Douglassville Disposal Site RA
Halliburton NUS Job No. 1129

SUBJECT: On Site Neutralization Summary Report

Attached, please find the On Site Neutralization Summary Report for neutralization activities conducted at the Douglassville Disposal Site.

M. Snyder
01/17/92

ON SITE NEUTRALIZATION SUMMARY REPORT
Douglassville Disposal Site
HALLIBURTON NUS JOB NO. 1129

Introduction

During remedial activities conducted at the Douglassville Disposal site, waste stream analyses revealed that the pH of sludges removed and containerized from several tanks was less than 2.0. Due to the incineration vendors inability to accept wastes exhibiting pH characteristics less than 4.0, Halliburton NUS investigated methods of neutralizing the sludges on site. Bench scale testing of the waste sludges revealed a preferred method of proportionally mixing the waste streams from each tank prior to neutralization and then neutralizing the blended waste using hydrated lime. Refer to: Halliburton NUS Bench Scale Testing Report, Neutralization of Waste Materials From Tanks I10, I11, and M3, November 4, 1991.

Summary

Neutralization of the waste materials was conducted in 13 separate batches. A 20 cubic yard rolloff was used as a mixing chamber. Mixing was accomplishing utilizing a backhoe equipped with an extendable arm. A composite sample of each batch was collected by Halliburton NUS to verify neutralization. Upon verification, the materials were transferred to lined rolloff boxes, weighed, covered and staged on site prior to transportation to the incineration facilities.

Upon completion of on site neutralization activities, Halliburton NUS obtained a composite sample from each lined rolloff box to confirm neutralization. A sample was also composited of waste material from each rolloff box in order to reprofile the waste material for the incineration facilities.

On-Site Neutralization

On November 8, 1991, drummed waste materials for tanks I10, I11 and M3 were removed from inventory and staged in the exclusion zone in preparation for neutralization activities. Drums were sorted and staged in thirteen separate batches of approximately 28 drums each. Each batch contained the following proportion: 3 parts I10; 3 parts I11: [illegible] M3

Neutralization activities were conducted from Tuesday, November 12, 1991 through Friday, November 22, 1991. A 20 cubic yard rolloff box was staged on the truck decontamination pad and the drums of waste material were manually dumped into the rolloff box prior to mixing. The truck decontamination pad was utilized to provide secondary containment and served as an exclusion zone. All waste handling activities were conducted using Level C protection. Mixing was accomplished using a 580 Case backhoe equipped with an extendable arm.

Hydrated lime ($Ca(OH)_2$-70% CaO equivalent) was manually added to neutralize the materials. Generally, lime to waste addition ratios were 6.9% by weight. Each batch was mixed for a minimum of one hour subsequent to lime addition and a composite sample of the batch was obtained by Halliburton NUS in order to verify neutralization.

A synopsis of neutralization activities for each batch is presented in Appendix A.

Field Observations

During neutralization activities, odors were noted emanating from the batches. The odors ranged from a heavy acid odor prior to mixing, to a sweet solvent-like odor observed after mixing. Additionally, on several humid days, vapors appearing to be similar to water vapor were observed emanating from the mixture. During neutralization mixing, the outside of the mixing chamber was observed to become slightly warmer than ambient temperatures.

Prior to neutralization, small quantities of free liquids and oils were present in the rolloff, however after neutralization, no free liquids remained.

A slight color change was noted during neutralization, the material changing from dark to a lighter color.

Compliance Testing and Results

The objective of the treatment was to achieve a waste pH of >4 to <10. PH measurements were conducted by Halliburton NUS in the field utilizing a portable pH meter. The pH meter was calibrated daily using pH buffer solutions. Prior to transferring each treated batch from the mixing chamber, Halliburton NUS obtained a composite sample of each batch. The sample was composed of a minimum of five grab samples collected at various points throughout the mixing chamber.

The pH of each batch was then determined by diluting 5 grams of the material with 100 grams of de-ionized water and mixing prior to measuring the pH. This is the method utilized to determine pH at the incineration facility. Due to the variations in pH values and the difficulty in obtaining a specific pH for each batch, the pH determination procedure was repeated a minimum of three times for each batch.

At the completion of neutralization activities, Halliburton NUS obtained a composite sample from each rolloff box. Each sample was composed of a minimum of five grab samples collected at various points throughout the container. PH measurements were performed according to procedures described above.

A summary of pH values recorded for each container and batch is presented below in Table 1.

Table 1 - PH Values

Rolloff #1 - 9.0, 8.6

Batch #1	7.3, 4.5, 5.1
Batch #2	5.0, 7.5, 10.2, 10.1
Batch #3 (1/2)	10.6, 9.8, 10.0, 9.6

Rolloff #2 - 4.1, 4.5, 4.5

Batch #3 (1/2)	10.6, 9.8, 10.0, 9.6
Batch #4	3.75, 8.5, 9.2, 7.5
Batch #5	6.25, 5.65, 5.61

Rolloff #3 - 4.6, 3.9, 4.8

Batch #6	10.2, 10.2, 7.9, 4.9
Batch #7	5.05, 6.4, 6.6
Batch #8 (2/3)	5.1, 7.1, 4.9

Rolloff #4 - 5.0, 6.6, 4.9

Batch #8 (1/3)	5.1, 7.1, 4.9
Batch #9	10.2, 7.7, 9.8
Batch #10	4.5, 5.4, 6.8

Rolloff #5 - 6.5, 6.5

Batch #11	9.1, 7.5, 8.1
Batch #12	7.3, 7.5, 7.6
Batch #13	6.1, 6.0, 5.9

Conclusion

Prior to staging each rolloff container at the laydown area on site, each rolloff container was weighed using the on-site truck scale. After determing that some of the containers may be too heavy for over the road transportation, the mixing box was cleaned, lined and used as an additional storage container. Table 3 presents the final weights of each container and contents.

Table 3 - Container/Materials Weights

BOX#	BOX/MATERIAL WEIGHT Pounds	BOX WEIGHT Pounds	MATERIAL WEIGHT Pounds
1)	40920	6120	34800
2)	42440	6880	35560
3)	41220	5900	35320
4)	37200	6500	30700
5)	43000	8180	34820
6)	18000	6680	11320
		Total	182520

Table 4 (below) summarizes weights of materials on a per batch basis. It should be noted that when comparing total waste material weights computed in tables 3 and 4, a weight loss of 3,983 lbs. or 2.14% has been experienced. This weight loss may be due to one or a combination of the following factors: a) the weight of plastic drum liners present in the orginal containers (drums) combined with small amounts of waste material remaining on the drum liner [illegible] water vapor/solvents being driven off by the heat reaction and c) accuracy of measurements.

Table 4

ON SITE WASTE NEUTRALIZATION
BATCH WEIGHTS SUMMARY - POUNDS

BATCH #	I10	I11	M3	LIME	TOTAL WASTE	TOTAL
1	6492	7386	3401	1300	17279	18579
2	5611	5710	2986	925	14307	15232
3	5295	5823	2319	875	13437	14312
4	5376	5759	2097	750	13232	13982
5	5440	5679	2200	800	13319	14119
6	5060	5467	2114	750	12641	13391
7	5262	5696	2063	800	13021	13821
8	5224	5836	2669	825	13729	14554
9	5449	5107	2448	800	13004	13804
10	4801	5531	2126	750	12458	13208
11	4851	5625	2086	750	12562	13312
12	4771	5451	2398	750	12623	13373
13	8851	2831	1934	1200	13616	14816
TOTAL	72483	71904	30841	11275	175228	186503

APPENDIX A

Waste Material Neutralization Synopsis
Batch #1

Tues., Nov. 12 - 09:40 TCI begins placing waste material into 20 yd. - rolloff box

	# of drums	Net Wt. of materials (lbs.)
I10	12	5303
I11	12	5755
M3	6	3401

12:45 - Prior to mixing 25-fifty lb. bags of hydrated lime were added to batch.

Lime 1250 lbs. batch = 14459
Lime: Total = 8.6%

14:15 - M.S. collects composite sample of batch (3 grabs) pH= 11.2 (Note: all pH determinations use 5g sample diluted with 100g DIH_2O)

15:10 - TCI continues mixing.

15:20 - M.S. collects composite sample (3 grabs) pH=10.3
- TCI/Halliburton NUS conclude to let batch sit overnight, remix & check pH.

Wed., Nov. 13, -
07:50 - TCI continues mixing batch #1.
08:10 - M.S. collects composite sample (3 grabs) pH=10.5
08:30 - TCI/HNUS conclude to add 3 drums each of I10 & I11.
09:00 - TCI adds drums & mixes.

	# of drums	Net Wt. of materials (lbs.)
I10	3	1189
I11	3	1631

09:15 - TCI begins mixing.
09:35 - M.S. collects composite sample (3 grabs) pH=4.36
10:15 - TCI continues mixing, adds 1-fiftv lb. bag of Lime.
10:35 - M.S. collects composite sample (3 grabs) determines pH of 3 grab samples from composite.
pH #1 = 7.3
pH #2 = 4.5
pH #3 = 5.1

Wed., Nov. 13 cont'd. HNUS/TCI conclude that pH of batch is >5 and <10.

11:15 - TCI transfers batch to 30 cu. yd. rolloff for storage.

Batch #1	I10	I11	M3	Lime
lbs.	6492	7386	3401	1300

Mixture Ratios

M3: I Total = 24.5%
Lime: I Total = 9.4%
Lime: Total = 7.5%

Waste Material Neutralization Synopsis
Batch #2

Wed., Nov. 13 - 13:00 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5611
I11	12	5710
M3	6	2986

14:05 - TCI mixes material prior to adding lime.
14:15 - M.S. samples mixture pH= 1.71
TCI adds 18.5 - fifty lb. bags of lime.
14:40 - M.S. collects composite sample (6 grabs)
pH= 10.5 rerun: pH=11.2
Material is very oily, did not go into solution well for pH measurement, lime granules still present in mixture.
15:00 - TCI/HNUS decide to let batch sit overnight, remix and recheck pH.

Thurs., Nov. 14, 07:45 - TCI remixes batch, adds water to aid mixing.
HNUS/TCI discusses reasons for difficultly in mixing and pH measurement. Conclude that, in the future, less M3 materials will be used.

08:15 - M.S. collects composite sample (5 grabs).
Lime granules are no longer evident in mixture, however, difficulty is still experienced diluting material with water for pH measurement.

pH #1 = 5.0
pH #2 = 7.5
pH #3 = 10.2
pH #4 = 10.1

08:25 - HNUS/TCI conclude that pH of batch is >5 and <10. Discuss establishing a pH window for determing what pH is acceptable to send to incinerator. Conclude, that due to the difficulty in obtaining a specific pH, a pH window of >5 and <10 should be considered acceptable.

09:00 - TCI loads batch #2 into rolloff #1

Batch #2	I10	I11	M3	Lime
lbs.	5611	5710	2986	925

Mixture Ratios

M3: I Total = 26.4%
Lime: I Total = 8.2%
Lime: Total = 6.5%

Waste Material Neutralization Synopsis
Batch #3

Thurs., Nov. 14 - 09:40 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5295
I11	12	5823
M3	4	2319

10:30 - TCI mixes batch prior to lime addition.
10:40 - TCI adds 17.5 - fifty lb. bags lime.
Batch gets very dry, TCI sprays water on batch while mixing. TCI mixes for 1 hour.
11:45 - M.S. collects composite sample (4 grabs)

pH #1 = 10.6
pH #2 = 9.8
pH #3 = 10.0
pH #4 = 9.6

12:15 - HNUS/TCI conclude that pH is within acceptable limits.

13:30 - TCI loads approximately 1/2 batch #3 into Rolloff #1.
TCI mixes material into Rolloff #1.

13:45 - M.S. collects composite sample (4 grabs) of Rolloff #1. pH = 9.5

Batch #3	I10	I11	M3	Lime
lbs.	5295	5823	2319	875

Mixture Ratios
M3: I Total = 20.9%
Lime: I Total = 7.9%
Lime: Total = 6.5%

Waste Material Neutralization Synopsis
Batch #4

Fri., Nov. 15 - 08:35 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5376
I11	12	5759
M3	4	2097

09:30 - TCI mixes materials.
09:40 - TCI adds 15 - fifty lb. bags lime, begins mixing.
11:10 - M.S. collects composite sample (6 grabs)

pH #1 = 3.75
pH #2 = 8.55
pH #3 = 9.2
pH #4 = 7.49

11:30 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #4 lbs.	I10	I11	M3	Lime
	5376	5759	2097	750

Mixture Ratios
M3: I Total = 18.8%
Lime: I Total = 6.7%
Lime: Total = 5.7%

12:00 - TCI loads batch into Rolloff #2.
Note: Rolloff #2 also contains approximately 1/2 Batch #3.

Waste Material Neutralization Synopsis
Batch #5

Fri., Nov. 15 - 12:30 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5440
I11	12	5679
M3	4	2200

13:20 - Begins mixing.
13:35 - TCI adds 16 - fifty lb. bags lime, begins mixing.
15:00 - TCI mixes batch for a total of 1.5 hrs.

Sat., Nov. 16 - 06:40 - M.S. collects composite sample - 6 grabs.

pH #1 = 6.25
pH #2 = 5.65
pH #3 = 5.61

07:15 - HNUS concludes that pH is within acceptable limits.
TCI loads batch into Rolloff #2.
Note: This completes Rolloff #2.

Batch #5 lbs.	I10	I11	M3	Lime
	5440	5679	2200	800

Mixture Ratios
M3: I Total = 19.8%
Lime: I Total = 7.2%
Lime: Total = 6.0%

Waste Material Neutralization Synopsis
Batch #6

Sat., Nov. 16 - 08:50 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5060
I11	12	5467
M3	4	2114

09:30 - TCI mixes materials.
09:40 - TCI adds 15 - fifty lb. bags lime, begins mixing.
11:45 - M.S. collects composite sample (6 grabs)

pH #1 = 10.2
pH #2 = 10.2
pH #3 = 7.9
pH #4 = 4.9

11:10 - HNUS/TCI conclude that pH is within acceptable limits, however, TCI should mix for additional 1/2 hr. prior to transferring batch.

Batch #6	I10	I11	M3	Lime
lbs.	5060	5467	2114	750

Mixture Ratios
M3: I Total = 20.1%
Lime: I Total = 7.1%
Lime: Total = 5.9%

12:40 - TCI loads batch into Rolloff #3.

Waste Material Neutralization Synopsis
Batch #7

Sat., Nov. 16 - 13:10 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5262
I11	12	5696
M3	4	2063

14:00 - TCI mixes materials.
14:10 - TCI adds 16 - fifty lb. bags lime, begins mixing.

Mon., Nov. 18 - 08:35 - M.S. collects composite sample (6 grabs)

pH #1 = 5.05
pH #2 = 6.4
pH #3 = 6.6

09:00 - HNUS/TCI conclude that pH is within acceptable limits, however, TCI should mix for additional 1/2 hr. prior to transferring batch.

Batch #7	I10	I11	M3	Lime
lbs.	5262	5696	2063	800

Mixture Ratios
M3: I Total = 18.8%
Lime: I Total = 7.3%
Lime: Total = 6.1%

09:20 - TCI loads batch into Rolloff #3.

Waste Material Neutralization Synopsis
Batch #8

Mon., Nov. 18 - 11:10 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5224
I11	12	5836
M3	4	2669

11:50 - TCI mixes materials.
12:00 - TCI adds 16.5 - fifty lb. bags lime, begins mixing.
14:00 - M.S. collects composite sample (6 grabs)

pH #1 = 5.1
pH #2 = 7.1
pH #3 = 4.9

14:20 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #8 lbs.	I10	I11	M3	Lime
	5224	5836	2669	825

Mixture Ratios
M3: I Total = 24.1%
Lime: I Total = 7.5%
Lime: Total = 6.0%

14:50 - TCI loads 2/3 batch into Rolloff #3.

Tues., Nov. 19 - 12:50 - TCI loads 1/3 batch into Rolloff #4.

Waste Material Neutralization Synopsis
Batch #9

Tues., Nov. 19 - 13:10 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	5449
I11	12	5107
M3	4	2448

13:50 - TCI mixes materials.
14:00 - TCI adds 16 - fifty lb. bags lime, begins mixing.
15:00 - M.S. collects composite sample (6 grabs)

pH #1 = 10.2
pH #2 = 7.7
pH #3 = 9.8

15:20 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #9 lbs.	I10	I11	M3	Lime
	5449	5107	2448	800

Mixture Ratios
M3: I Total = 23.2%
Lime: I Total = 7.6%
Lime: Total = 6.2%

Wed., Nov. 20, 7:20 - TCI loads batch into Rolloff #4.

Waste Material Neutralization Synopsis
Batch #10

Wed., Nov. 20 - 08:20 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	4801
I11	12	5531
M3	4	2126

09:10 - TCI mixes materials.
09:15 - TCI adds 15 - fifty lb. bags lime, begins mixing.
10:20 - M.S. collects composite sample (6 grabs)

pH #1 = 4.5
pH #2 = 5.4
pH #3 = 6.8

10:40 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #10 lbs.	I10	I11	M3	Lime
	4801	5531	2126	750

Mixture Ratios
M3: I Total = 20.6%
Lime: I Total = 7.3%
Lime: Total = 6.0%

11:00 - TCI loads batch into Rolloff #4.

Waste Material Neutralization Synopsis
Batch #11

Wed., Nov. 20 - 12:45 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	4851
I11	12	5625
M3	4	2086

13:30 - TCI mixes materials.
13:35 - TCI adds 15 - fifty lb. bags lime, begins mixing.
14:45 - M.S. collects composite sample (6 grabs)

pH #1 = 9.1
pH #2 = 7.5
pH #3 = 8.1

15:10 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #11	I10	I11	M3	Lime
lbs.	4851	5625	2086	750

Mixture Ratios
M3: I Total = 19.9%
Lime: I Total = 7.2%
Lime: Total = 6.0%

15:10 - TCI loads batch into Rolloff #5.

Waste Material Neutralization Synopsis
Batch #12

Thurs., Nov. 21 - 08:15 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	12	4771
I11	12	5454
M3	4	2398

09:00 - TCI mixes materials.
09:05 - TCI adds 14 - fifty lb. bags lime, begins mixing.
10:00 - M.S. collects composite sample (6 grabs)

pH #1 = 3.3
pH #2 = 4.1
pH #3 = 4.0

10:15 - M.S. discusses results with M. Dixon. M. Dixon says that TCI ran out of lime, that is why on 14 bags were added.
11:00 - Lime arrives, TCI adds one bag to Batch #12, mixes.
11:20 - M.S. collects composite sample (6 grabs).

pH #1 = 7.3
pH #2 = 7.5
pH #3 = 7.6

11:40 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #12 lbs.	I10	I11	M3	Lime
	4771	5454	2398	750

Mixture Ratios
M3: I Total = 23.4%
Lime: I Total = 7.3%
Lime: Total = 5.9%

11:40 - TCI loads batch into Rolloff #5.

Waste Material Neutralization Synopsis
Batch #13

Thurs., Nov. 21 - 13:00 - TCI begins placing waste material into rolloff for mixing.

	# of drums	Net Wt. of materials (lbs.)
I10	22	8851
I11	6	2831
M3	4	1934

13:50 - TCI mixes materials.
14:00 - TCI adds 15 - fifty lb. bags lime, begins mixing.
15:00 - M.S. collects composite sample (6 grabs)

pH #1 = 2.7
pH #2 = 2.7

15:15 - Discuss with M. Dixon, decide that, since there is no more acid material available to add one bag of lime and mix.
15:40 - M.S. collects composite sample - 6 grabs.

pH #1 = 2.8
pH #2 = 2.8

15:55 - Discuss with M. Dixon, decide to add 2 bags lime and mix.

16:15 - M.S. collects composite sample - 6 grabs.

pH #1 = 3.6
pH #2 = 3.4

16:30 - Discuss with M. Dixon, he says he must purchase lime.

Fri., Nov. 22, 1991 - 07:15 - TCI mixes batch.

07:40 - M.S. collects composite sample - 3 grabs

pH #1 = 3.0
pH #2 = 2.8

07:50 - Discuss with M. Dixon, he will run out and purchase lime.

09:30 - TCI adds 2 bags lime and mixes.
10:15 - M.S. collects composite sample - 6 grabs.

pH #1 = 3.1
pH #2 = 3.1

10:25 - Discuss with M. Dixon. M. Dixon says that the lime he bought today (4 bags) was 30% CaO as opposed to 70%, that they had been using.
10:30 - TCI adds 2 bags lime and mixes.
11:20 - M.S. collects composite sample - 6 grabs.

pH #1 = 3.3
pH #2 = 3.4

11:40 - Discuss with M. Dixon. He will purchase additional lime.
12:30 - TCI adds 2 bags lime (70% CaO) and mixes.
12:55 - M.S. collects composite sample - 6 grabs.

pH #1 = 6.1
pH #2 = 6.0
pH #3 = 5.9

13:10 - HNUS/TCI conclude that pH is within acceptable limits.

Batch #13 lbs.	I10	I11	M3	Lime
	8851	2831	1934	1000 (70% CaO) 200 (30% CaO)

Mixture Ratios

M3: I Total = 16.6%
Lime: I Total = 10.3%
Lime: Total = 8.8%

13:15 - TCI loads batch into Rolloff #5.